

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 78 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 78 recites the limitation "the eliminating is performed over a width... at least equal to a width of a zone of the first wafer which can not, without said step of eliminating, be assembled with the second wafer." This limitation renders the claim indefinite, since it is unclear how one of ordinary skill in the art would determine the zone of the wafer which "can not, without said step of eliminating, be assembled with the second wafer."

3. Claim 85 is rejected under 35 U.S.C. 112, 4th paragraph, as being of improper dependent form for failing to further limit the subject matter of the claim upon which it depends, or for failing to include all the limitations of the claim upon which it depends.

Claim 85 recites the limitation "wherein the assembling the first and second wafers is performed via molecular adhesion or via bonding using an adhesive substance." This limitation fails to further limit the subject matter of the parent claim 1 reciting "assembling the upper transplant layer of the first wafer onto the second wafer via molecular adhesion."

4. Applicant may cancel the claim(s), amend the claim(s) to place the claim(s) in proper dependent form, rewrite the claim(s) in independent form, or present a sufficient showing that the dependent claim(s) complies with the statutory requirements.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 68, 74, 75, 76-79, 85, 87-93, and 98 rejected under 35 U.S.C. 103(a) as being unpatentable over MacNamara (US 6, 841, 848) in view of Kim (US 6, 790, 748).

Regarding claim 68, MacNamara discloses a method of assembling a first wafer onto a second wafer, the first wafer (Fig.4, numeral 9) including a lower layer having no circuits and components (lower part of (9)) and an upper transplant layer (upper part of (9)) arranged at least under a frontal side of the first wafer (9), the transplant layer having at least one of circuits and components (note: (9) is a device layer), comprising: eliminating material from the upper transplant layer and the lower layer from the frontal side of the first wafer in an outside peripheral area of the first wafer (Fig. 8, numeral 9; column 9, lines 30-45) over a thickness less than an entire thickness of the first wafer (9), but greater than an entire thickness of the upper transplant layer (upper part of (9)), and assembling the upper transplant layer of the first wafer(upper part of (9)) onto the second wafer (Fig.10, numeral 30) via molecular adhesion (column 9, lines 50-67) after said eliminating material (Fig.8).

MacNamara does not disclose that eliminating is performed after the at least one of circuits and components have been formed in the upper transplant layer.

Kim however discloses that eliminating of material (Fig.4, numeral 132) is performed after the at least one of circuits and components (Fig.1, numeral 110) have been formed in the upper transplant layer (Fig.1, upper part of (106)).

It would have been therefore obvious to one of ordinary skill in the art at the time the invention was made to modify MacNamara with Kim to perform eliminating after the at least one of circuits and components have been formed in the upper transplant layer for the purpose of fabrication stacked microelectronic device (Kim, column 3, lines 59-67).

Regarding claim 74, MacNamara discloses that the first wafer is chamfered and includes at least a chamfered edge (Fig.7, numeral 26).

Regarding claim 75, MacNamara discloses that the eliminating is performed over a width, measured on a plane parallel to the frontal side of the first wafer, at least equal to a width of the chamfered edge, measured on the same plane (Fig.8, numeral W).

Regarding claim 76, MacNamara discloses additional eliminating of material after said assembling of the first and second wafers (Fig.11, numeral 29).

Regarding claim 77, MacNamara does not disclose the eliminating is performed over a thickness of the first wafer between 1  $\mu\text{m}$  and 100  $\mu\text{m}$ . MacNamara however discloses that eliminating is performed to avoid danger of an unbounded peripheral area being formed around of a composite wafer (column 8, lines 53-60).

It would have been however obvious to one of ordinary skill in the art at the time the invention was made to adjust the thickness of the first wafer to be in the claimed range for the purpose of optimizing the lamination process (MacNamara, column 8, lines 53-60).

Regarding claim 78, MacNamara discloses that the eliminating is performed over a width, measured on a plane parallel to the frontal side of the first wafer, at least equal to a width of a zone of the first wafer which cannot, without eliminating, be assembled with the second wafer (Fig.8, numeral W).

Regarding claim 79, MacNamara does not disclose that the eliminating is performed over a width, measured on a plane parallel to that of the first wafer of between 100  $\mu$ m and 5  $\mu$ m. MacNamara however discloses that eliminating is performed to avoid danger of an unbounded peripheral area being formed around of a composite wafer (column 8, lines 53-60).

It would have been however obvious to one of ordinary skill in the art at the time the invention was made to adjust the thickness of the first wafer to be in the claimed range for the purpose of optimizing the lamination process (MacNamara, column 8, lines 53-60).

Regarding claim 85, MacNamara discloses that the assembling the first and second wafers is performed via molecular bonding (column 9, lines 50-67).

Regarding claim 87, MacNamara discloses that the eliminating takes place after a previous surface preparation of the first wafer for a purpose of assembling (column 9, lines 15-20).

Regarding claim 88, MacNamara discloses the eliminating takes place before surface penetration of the first wafer for a purpose of assembling or transplanting (column 9, lines 50-55).

Regarding claim 89, MacNamara discloses that the eliminating is performed via plasma etching (column 9, lines 25-50).

Regarding claim 90, MacNamara discloses that at least one of the first and second wafers is made in a semiconductor material (column 8, lines 1-15).

Regarding claim 91, MacNamara discloses at least one of the first and second wafers is made of silicon (column 8, lines 1-15).

Regarding claim 92, MacNamara discloses at least one of the first and second wafers is made of an insulating material (column 8, lines 1-15).

Regarding claim 93, MacNamara discloses that the eliminating is performed in a regular manner around the first wafer (Fig..8).

Regarding claim 98, MacNamara discloses additional eliminating of material from the first wafer from a lateral side of the first wafer over a length  $L_2$  that removes some material of the upper transplant layer (Fig. 11, numeral 29)

#### ***Response to Arguments***

7. Applicant's arguments with respect to claims 68-72, 74-79, 85, 87-93, and 98 have been considered but are moot in view of the new ground(s) of rejection.
8. Examiner also would like to note that Applicant's arguments that MacNamara in view of Kim does not disclose the features of claim 68 are not persuasive because of the following reasons. First, in response to applicant's arguments against the

references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Second, MacNamara discloses eliminating material from the upper transplant layer and the lower layer from the frontal side of the first wafer in an outside peripheral area of the first wafer (Fig. 8, numeral 9; column 9, lines 30-45) and assembling the upper transplant layer of the first wafer(upper part of (9)) onto the second wafer (Fig.10, numeral 30) via molecular adhesion (column 9, lines 50-67) after said eliminating material (Fig.8). Although, MacNamara does not disclose that eliminating is performed after the at least one of circuits and components have been formed in the upper transplant layer, Kim discloses that eliminating of material (Fig.4, numeral 132) is performed after the at least one of circuits and components (Fig.1, numeral 110) have been formed in the upper transplant layer (Fig.1, upper part of (106)).

It would have been therefore obvious to one of ordinary skill in the art at the time the invention was made to modify MacNamara with Kim to perform eliminating after the at least one of circuits and components have been formed in the upper transplant layer for the purpose of fabrication stacked microelectronic device (Kim, column 3, lines 59-67).

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JULIA SLUTSKER whose telephone number is (571)270-3849. The examiner can normally be reached on Monday-Friday, 8 a.m.-5 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kiesha Bryant can be reached on (571)-272-1844. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JULIA SLUTSKER/  
Primary Examiner, Art Unit 2891

October 18, 2011